

## MORPH MAP BASED REAL-TIME RENDERING

### Abstract of the Disclosure

Efficient, real-time rendering of an output image is implemented using one or more input images and morph maps that include data defining characteristics of each pixel in the output image. The input images can include textures and other graphic data for a surface of an object. Any of a number of different known techniques are used to produce the data included in a morph map for rendering a scene. The morph map is implemented for a rectangular area  $M(x, y)$  and associates a set of  $M_j(x, y)$  data with each pixel position in the rectangular area, where  $j$  is a positive integer providing an index to one of the sets of pixel data associated with a pixel position. A set of up to seven parameters are included in the  $M_j(x, y)$  data for each pixel position. Using the morph map, a real-time rendering engine performs a transformation when the displayed scene must be modified in response to a user interaction or in response to some software program event. The real-time rendering engine combines the data in the morph maps and the different input images at a specific pixel position, producing an output value for the pixels that have changed. Only the changed pixels need to be recomputed and newly rendered in the output image. An indexing mechanism is used to minimize the computation load. Image morphing is accomplished by combining two warped images in a range, using either a constant blended value or a space-variant value.